

We claim:

1. A method of pre-correcting a DTV
translator for distortion produced by a high power
5 amplifier and emission mask filter of the DTV translator,

the DTV translator having a receiver and a transmitter,
the method comprising:

coupling an output of the high power amplifier
and emission mask filter to the receiver;

10 tuning the receiver to the output of the high
power amplifier and emission mask filter; and,

pre-correcting the DTV translator in response
to the tuned signal.

15 2. The method of claim 1 further comprising
de-coupling the receiver and the transmitter during the
coupling of an output of the high power amplifier and

emission mask filter to the receiver, the tuning of the
receiver to the output of the high power amplifier and
20 emission mask filter, and the pre-correcting of the DTV
translator in response to the tuned signal.

3. The method of claim 1 wherein the receiver includes an equalizer, wherein the transmitter includes a pre-equalizer, wherein the tuning of the receiver to the output of the high power amplifier and emission mask filter comprises tuning the receiver to the output of the high power amplifier and emission mask filter such that the equalizer adapts to the tuned signal, and wherein the pre-correcting of the DTV translator in response to the tuned signal comprises transferring tap values from the equalizer to the pre-equalizer.

4. The method of claim 3 further comprising de-coupling the receiver and the transmitter during the coupling of an output of the high power amplifier and emission mask filter to the receiver, the tuning of the receiver to the output of the high power amplifier and emission mask filter, and the transferring of tap values from the equalizer to the pre-equalizer.

20 5. The method of claim 1 further comprising using the receiver for verifying performance of the DTV translator.

6. A method of calibrating a receiver of a
DTV translator having the receiver and a transmitter, the
method comprising:

coupling an output of the transmitter to the
5 receiver;

tuning the receiver to the output of the
transmitter; and,

calibrating the receiver in response to the
tuned signal.

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7. The method of claim 6 further comprising
de-coupling the receiver and the transmitter during the
coupling of an output of the transmitter to the receiver,
the tuning of the receiver to the output of the
15 transmitter, and the calibrating of the receiver in
response to the tuned signal.

8. The method of claim 6 wherein the receiver
includes an equalizer, wherein the transmitter includes a
20 pre-equalizer, wherein the tuning of the receiver to the
output of the transmitter comprises tuning the receiver
to the output of the transmitter such that the equalizer
adapts to the tuned signal, and wherein the calibrating
of the receiver in response to the tuned signal comprises

transferring tap values from the equalizer to the pre-equalizer.

9. The method of claim 8 further comprising
5 de-coupling the receiver and the transmitter during the
coupling of an output of the transmitter to the receiver,
the tuning of the receiver to the output of the
transmitter such that the equalizer adapts to the tuned
signal, and the transferring of tap values from the
10 equalizer to the pre-equalizer.

10. The method of claim 6 further comprising using the receiver for verifying performance of the DTV translator.

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11. A method of pre-correcting a DTV translator for distortion produced by a high power amplifier and emission mask filter of the DTV translator, the DTV translator having a receiver and a transmitter,
20 the method comprising:

coupling an output of the transmitter to the receiver;

tuning the receiver to the output of the transmitter;

calibrating the receiver in response to the tuned transmitter output signal;

transferring the calibration to the transmitter;

5 coupling an output of the high power amplifier and emission mask filter to the receiver;

tuning the receiver to the output of the high power amplifier and emission mask filter; and,

pre-correcting the DTV translator in response

10 to the tuned high power amplifier and emission mask filter output signal.

12. The method of claim 11 further comprising de-coupling the receiver and the transmitter during the

15 coupling of an output of the transmitter to the receiver, the tuning of the receiver to the output of the transmitter, the calibrating of the receiver in response to the tuned transmitter output signal, the transferring of the calibration to the transmitter, the coupling of an

20 output of the high power amplifier and emission mask filter to the receiver, the tuning of the receiver to the output of the high power amplifier and emission mask filter, and the pre-correcting of the DTV translator in

response to the tuned high power amplifier and emission mask filter output signal.

13. The method of claim 11 wherein the
5 receiver includes an equalizer, wherein the transmitter includes a pre-equalizer, wherein the calibrating of the receiver in response to the tuned transmitter output signal comprises calibrating the receiver in response to the tuned transmitter output signal such that the
10 equalizer adapts to the tuned transmitter output signal, wherein the transferring of the calibration to the transmitter comprises transferring tap values from the equalizer to the pre-equalizer, wherein the tuning of the receiver to the output of the high power amplifier and
15 emission mask filter comprises tuning the receiver to the output of the high power amplifier and emission mask filter such that the equalizer adapts to the tuned high power amplifier and emission mask filter output signal, and wherein the pre-correcting of the DTV translator
20 comprises transferring tap values from the equalizer to the pre-equalizer.

14. The method of claim 13 further comprising
de-coupling the receiver and the transmitter during the
coupling of an output of the transmitter to the receiver,
the tuning of the receiver to the output of the
5 transmitter, the calibrating of the receiver in response
to the tuned transmitter output signal, the transferring
of the tap values from the equalizer to the pre-
equalizer, the coupling of an output of the high power
amplifier and emission mask filter to the receiver, the
10 tuning of the receiver to the output of the high power
amplifier and emission mask filter, and the transferring
of tap values from the equalizer to the pre-equalizer.

15. The method of claim 11 further comprising:
15 reloading and freezing the calibration tap
values back into the equalizer; and,
verifying performance of the DTV translator
based on the calibrated receiver and the pre-distorted
transmitter.

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16. The method of claim 15 further comprising
de-coupling the receiver and the transmitter during the
coupling of an output of the transmitter to the receiver,
the tuning of the receiver to the output of the

transmitter, the calibrating of the receiver in response to the tuned transmitter output signal, the transferring of the calibration to the transmitter, the coupling of an output of the high power amplifier and emission mask filter to the receiver, the tuning of the receiver to the output of the high power amplifier and emission mask filter, and the pre-correcting of the DTV translator in response to the tuned high power amplifier and emission mask filter output signal.

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17. The method of claim 15 wherein the receiver includes an equalizer, wherein the transmitter includes a pre-equalizer, wherein the calibrating of the receiver in response to the tuned transmitter output signal comprises calibrating the receiver in response to the tuned transmitter output signal such that the equalizer adapts to the tuned transmitter output signal, wherein the transferring of the calibration to the transmitter comprises transferring tap values from the equalizer to the pre-equalizer, wherein the tuning the receiver to the output of the high power amplifier and emission mask filter comprises tuning the receiver to the output of the high power amplifier and emission mask filter such that the equalizer adapts to the tuned high

power amplifier and emission mask filter output signal,
and wherein the pre-correcting of the DTV translator
comprises transferring tap values from the equalizer to
the pre-equalizer.

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18. The method of claim 17 further comprising
de-coupling the receiver and the transmitter during the
coupling of an output of the transmitter to the receiver,
the tuning of the receiver to the output of the
10 transmitter, the calibrating of the receiver in response
to the tuned transmitter output signal, the transferring
of the tap values from the equalizer to the pre-
equalizer, the coupling of an output of the high power
amplifier and emission mask filter to the receiver, the
15 tuning of the receiver to the output of the high power
amplifier and emission mask filter, and the transferring
of tap values from the equalizer to the pre-equalizer.

19. A DTV translator for use with a receiving
20 antenna and a transmitting antenna comprising:
a receiver including a tuner and an equalizer;
a transmitter including a pre-equalizer and a
transmitter output;

a high power amplifier and emission mask filter coupled to the transmitter output and having a high power amplifier and emission mask filter output;

5 a first switch coupled to the tuner and Adapted to be coupled the receiving antenna;

a second switch coupled to the transmitter output, to the high power amplifier and emission mask filter output, and to the first switch;

10 a third switch coupled between the receiver and the transmitter; and,

a controller, wherein the controller during normal operation tunes the tuner to a received channel and operates the first and third switches to couple the receiving antenna to the tuner and to couple the receiver to the transmitter, and wherein the controller during a set-up operation (i) operates the first, second, and third switches to couple the transmitter output to the tuner and to disconnect the receiver from the transmitter, (ii) operates the tuner to tune to the transmitter output such that taps of the equalizer adjust to calibration values that reduce receiver related distortion, (iii) transfers the calibration values from the equalizer to the taps of the pre-equalizer, (iv)

20 operates the first, second, and third switches to couple

the high power amplifier and emission mask filter output to the tuner and to disconnect the receiver from the transmitter, (v) operates the tuner to tune to the high power amplifier and emission mask filter output such that 5 the taps of the equalizer adjust to pre-distortion values that reduce high power amplifier and emission mask filter related distortion, and (vi) transfers the pre-distortion values from the equalizer to the taps of the pre-equalizer.

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20. The DTV translator of claim 19 wherein the controller further (vii) operates the first, second, and third switches to couple the high power amplifier and emission mask filter output to the tuner and to 15 disconnect the receiver from the transmitter, (viii) tunes the tuner to the high power amplifier and emission mask filter output, (ix) loads calibration values into the equalizer and freezes the taps of the equalizer at the calibration values, and (x) determines signal quality 20 at the output of the receiver.

21. The DTV translator of claim 19 wherein the receiver includes a VSB decoder, wherein the equalizer is coupled between the tuner and the VSB decoder, wherein

the transmitter includes a data and clock processor and a VSB modulator and upconverter, and wherein the pre-equalizer is coupled between the data and clock processor and the VSB modulator and upconverter.

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22. The DTV translator of claim 21 wherein the data and clock processor revises the virtual channel data packet and locks the transmitter symbol clock to the incoming symbol clock.

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23. The DTV translator of claim 21 wherein the controller further (vii) operates the first, second, and third switches to couple the high power amplifier and emission mask filter output to the tuner and to
15 disconnect the receiver from the transmitter, (viii) tunes the tuner to the high power amplifier and emission mask filter output, (ix) loads calibration values into the equalizer and freezes the taps of the equalizer at the calibration values, and (x) determines signal quality
20 at the output of the receiver.

24. The DTV translator of claim 23 wherein the data and clock processor revises the virtual channel data packet and locks the transmitter symbol clock to the incoming symbol clock.